Message

From: Camilla Beech [Camilla.Beech@oxitec.com]
Sent: 1/24/2017 6:00:33 PM
To: Wozniak, Chris [wozniak.chris@epa.gov]
Subject: Gonsalves 2013 reference from my EndNote library
Attachments: bats.pdf

Dear Chris

Second reference

Camilla

Gonsalves, L., et al. (2013). "Mosquito consumption by insectivorous bats: does size matter?" PLoS One **8**(10): e77183.

Insectivorous bats have often been touted as biological control for mosquito populations. However, mosquitoes generally represent only a small proportion of bat diet. Given the small size of mosquitoes, restrictions imposed on prey detectability by low frequency echolocation, and variable field metabolic rates (FMR), mosquitoes may not be available to or profitable for all bats. This study investigated whether consumption of mosquitoes was influenced by bat size, which is negatively correlated with echolocation frequency but positively correlated with bat FMR. To assess this, we investigated diets of five eastern Australian bat species (Vespadelus vulturnus Thomas, V. pumilus Gray, Miniopterus australis Tomes, Nyctophilus gouldi Tomes and Chalinolobus gouldii Gray) ranging in size from 4-14 g in coastal forest, using molecular analysis of fecal DNA. Abundances of potential mosquito and non-mosquito prey were concurrently measured to provide data on relative prey abundance. Aedes vigilax was locally the most abundant mosquito species, while Lepidoptera the most abundant insect order. A diverse range of prey was detected in bat feces, although members of Lepidoptera dominated, reflecting relative abundance at trap sites. Consumption of mosquitoes was restricted to V. vulturnus and V. pumilus, two smaller sized bats (4 and 4.5 g). Although mosquitoes were not commonly detected in feces of V. pumilus, they were present in feces of 55 % of V. vulturnus individuals. To meet nightly FMR requirements, Vespadelus spp. would need to consume ~600-660 mosquitoes on a mosquito-only diet, or ~160-180 similar sized moths on a moth-only diet. Lower relative profitability of mosquitoes may provide an explanation for the low level of mosquito consumption among these bats and the absence of mosquitoes in feces of larger bats. Smaller sized bats, especially V. vulturnus, are likely to be those most sensitive to reductions in mosquito abundance and should be monitored during mosquito control activities.